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Coupled atmosphere-wildland fire modelling

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A tight interaction exists between the development of a wildfire and the local meteorology near the front. The convective effects induced by the fire heat release can modify the local wind circulation and consequently affect the fire propagation. In this study we use a meso-scale numerical model in a Large Eddy Simulation (LES) configuration coupled to a reduced physical front tracking wildfire model to investigate the differences induced by the atmospheric feedback in propagation speed and behaviour. Simulations of typical experimental configurations show a good response of the coupled fire-atmospheric model. Numerical results matches
qualitatively observed values for fire induced winds and convection. Moreover simulations of the larger fires shown fire flumes rising over the boundary layer due to strong convection.
Both numerical models already have operational usage and might ultimately be run coupled to support decisions in wildfire management. Simulations of the typical fire configuration will be shown along with the behaviour of the fire front for these experiments.